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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,608	07/23/2003	Gianluca Bollito	Q76067	7606
23373 7590 11/15/2007 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER LEE, CYNTHIA K	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 11/15/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/624,608

Applicant(s)

BOLLITO ET AL.

Examiner

Cynthia Lee

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-23 and 31-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-23 and 31-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Response to Amendment***

This Office Action is responsive to the amendment filed on 4/16/2007. Claim 34 has been added. Claims 1, 3-23, 31-34 are pending.

Claims 1, 3-23, 31-34 are finally rejected for reasons stated herein below.

***Claims Analysis***

Claim 1 is considered to have invoked the 35 USC 112 6<sup>th</sup> paragraph as supported by the description of the conducting path on pg. 8 of the specification.

Claims 6, 7, and 11 were considered to have not invoked the 35 USC 112 6<sup>th</sup> paragraph because the "means plus function" has been sufficiently modified by structural limitations.

The limitation "made using MEMs technology" has been considered but was not given patentable weight because the courts have held that the method of forming the product is not germane to the issue of patentability of the product itself. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3-23, and 31-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application

was filed, had possession of the claimed invention. The limitation "to only a single flexible substrate" (claim 1) is not supported by the disclosure as originally filed. The limitation "a support consisting of a single flexible substrate" (claim 34) is not supported by the disclosure as originally filed (emphasis added).

The Examiner notes that the polymer protective layer RP in fig. 3 reads on a flexible substrate, thus the cells are in contact with two substrates RP and 21 in fig. 3.

Applicant is required to cancel the new matter in reply to this Office Action.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-9, 11, 12, 22, 23, 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) in view of Maynard (US 6541149) and Marchetti (US 6503654)

Pan discloses a fuel cell having a first electrode, a second electrode, and an electrolyte arranged between the first and the second electrode. The assembly is made of a plurality of layers on a flexible substrate. Pan discloses a plurality of cells on the same flexible substrate (fig. 3 and 4). The flexible substrate is Kapton®.

A first layer of metallic material rests on the flexible substrate and the first electrode comprises an anode catalyst. A second layer of metallic material rests on the electrolyte and the second electrode comprises a cathode catalyst. See fig. 2. A

protective layer is present on both sides of the metallic substrate made of Kapton ®. The electrolyte is made from Nafion ®. The means for conducting electrical current to the first electrode and the second electrode are in the form of metallic layers. The catalyst comprises platinum, ruthenium, and osmium [0015]. Conducting paths that electrically connect each cell to the next one is necessarily present for the series of fuel cell to operate. Pan discloses that the flexible substrate is in the form of a ribbon developing in length and is rolled up. See fig. 4. The fuel is methanol in aqueous solution [0031].

Pan does not disclose that the fuel cell is associated in an irremovable way with only a single flexible substrate (applicant's claims 1 and 34). Pan discloses that the fuel cell is associated with two flexible substrates (101 and 102 of fig. 2). Marchetti teaches that a carbon cloth of an electrode and a bipolar plate are bonded with an adhesive (Marchetti's claim 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a bonding agent to bind one or both flexible substrates of Pan to the membrane electrode assembly for the benefit of adhering the substrate(s) tightly to the membrane electrode assembly.

Pan does not disclose that the structure is miniaturized. However, Maynard teaches of forming a micro fuel cell for portable electrical devices. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to miniaturize Pan's fuel cell for the benefit of using it for portable electrical devices. Further, it has been held that a modification that would have involved a mere change in

the size of a component is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (1955).

Pan discloses delivery mean for delivering a fuel cell to each cell and discharge means for emptying water from each cell. The methanol fuel is delivered through the openings 112 (applicant's duct) in the flex substrate and by the porous material layers to the catalytic sites [0026]. Pan discloses that the liquid fuel supplies all portions of the fuel cell. The pores in the porous metal layer may be oriented in the local plane, or substantially in the local plane defined by the flexible substrates (applicant's claim 33). The pores may be further oriented such that liquid fuel will be transported in a specified direction within the pores metal layer so that liquid fuel reaches all, or substantially all, of the fuel side flex circuit [0031]. Thus, the duct 112 connects the fuel cells to each other (applicant's claim 1).

Claims 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) and Maynard (US 6541149) and Marchetti (US 6503654) as applied to claim 1 above and incorporated herein, and further in view of Narayanan (US 6432284).

Pan as modified by Maynard and Marchetti teaches all the elements of claim 1. Pan as modified by Manard and Marchetti does not teach that the electrolyte has a composite structure comprising Nafion® and zeolite. However, Narayanan teaches that Nafion coated with zeolite changes the permeability of Nafion® and thus, can be

used to reduced the crossover of methanol (9:10-20). Since Pan discloses of using methanol as fuel [0026], it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the fuel cell of Pan, Maynard, and Marchetti with Narayanan's Nafion ® electrolyte coated with zeolite for the benefit of reducing methanol crossover. Since zeolite imparts methanol reducing capabilities, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add zeolite to the electrode as well for the benefit of further reducing methanol crossover. Pan, Maynard, Marchetti, Narayanan are closely related to applicant's field of endeavor of power generating device using electro-oxidation and electro-reduction.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) and Maynard (US 6541149) and Marchetti (US 6503654) as applied to claim 1 above and incorporated herein, and further in view of Hinokuma (US 2003/0013003).

Pan modified by Maynard and Marchetti teaches all the elements of claim 1. Pan modified by Maynard and Marchetti does not teach that the catalyst contains carbon materials. However, Hinokuma teaches that fullerene catalyst exhibits superior current density and output characteristics [0018]. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify fuel cell of Pan, Maynard and Marchetti with fullerene catalyst for the benefit of improving the current density and output characteristics.

Claims 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) and Maynard (US 6541149) and Marchetti (US 6503654) as applied to claim 1 above and incorporated herein, and further in view of Shiue (US 6500575).

Pan modified by Maynard and Marchetti teaches all the elements of claim 1. Pan modified by Maynard and Marchetti does not teach a control system comprising a micro pump, a microcontroller, and a supercapacitor. However, Shiue teaches a battery with a control system to control air flowing through the batteries. Shiue teaches a piezoelectric micro pump to pump the air through the battery (5:20-50). The system further comprises a supercapacitor as an energy storage device (3:10-20). The system further comprises a control network (5:50-55). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add a control system to the fuel cell of Pan modified by Maynard and Marchetti for the benefit of controlling/regulating the system, such as air, fuel, and water. Shiue is closely related to Pan, Maynard, Marchetti, and applicant's field of endeavor of fuel cells because metal-air batteries are one type of fuel cells.

### ***Response to Arguments***

Applicant's arguments filed 10/9/2007 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number:  
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Art Unit: 1795

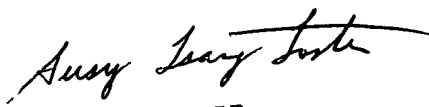
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ckl

Cynthia Lee

Patent Examiner

  
SUSY TSANG-FOSTER  
SUPERVISORY PATENT EXAMINER